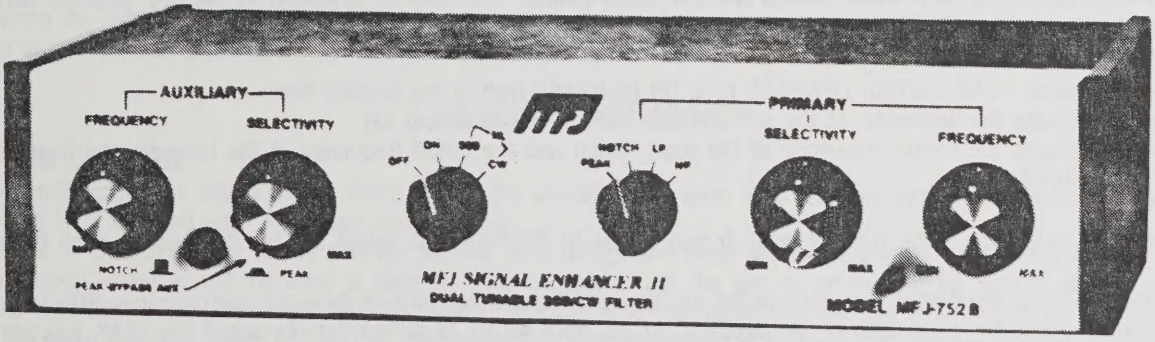
MFJ Signal Enhancer II

MODEL MFJ-752B



OWNER'S MANUAL

CAUTION: Read All Instructions Before Operating Equipment.

MFJ ENTERPRISES, INC.

P. O. BOX 494, MISSISSIPPI STATE, MS. 39762, USA

MFJ-1200-0037

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INTRODUCTION

The improved **MFJ-752 B SIGNAL ENHANCER II** is comprised of two tunable audio filtering systems designed to clarify and remove interfering signals from both voice (SSB or AM) and code (CW or RTTY) signals. This is accomplished by a primary filter which is a two-section, four-pole variable filter which has peak, notch, lowpass, and highpass functions, and by an auxillary filter which is a single section two pole peak or notch filter. These two independent filters allow you to remove interference while enhancing the desired signal.

INSTALLATION

1. Connect the power adapter or any 9 to 18 volt DC supply to the power jack on the back of the MFJ-752 B. If a supply other than the adapter is used it must have a 2.5 MM subminiature plug. Wire the plug so the tip is positive. An 18V, 300 mA supply is required to obtain the full two watts audio output.
2. Using the proper connector, connect a shielded lead from the external speaker or headphone jack of the transceiver or receiver to the MFJ-752 B. Use an RCA phono plug to connect to the filter input. There are two inputs on the MFJ-752 B allowing connection to two receivers to the MFJ-752 B for greater convenience. The input is selected by the slide switch above the input-jacks.
3. Connect a speaker to the filter using shielded wire with a mono ¼ in. phone plug at the filter speaker output. For best results use a 4 to 16 ohm speaker.
4. Headphone operation is accomplished by plugging headphones into the phone jack on the back of the MFJ-752 B. When stereo headphones are used you will hear the signals in simulated stereo, that is, the unfiltered audio is fed to one ear and the filtered audio is fed to the other ear. (See "SIMULATED STEREO OPERATION" section.)
5. If mono headphones are used or simulated stereo is not desired, use a ¼ in. **STEREO** phone plug and wire the headphones between the tip terminal and ground. Leave the ring terminal disconnected. Any impedance headphones from 4 ohms up will work. **NOTE: DO NOT USE A ¼ IN. MONO PLUG IN THE HEADPHONE OUTPUT. A MONO PHONE PLUG WILL SHORT THE FILTER INPUT POSSIBLY DAMAGING YOUR RIG OUTPUT.**

FRONT PANEL CONTROLS

POWER SWITCH:

Selects power OFF, power ON, SSB Noise Limiter and CW Noise Limiter. The filter is bypassed in the OFF position. NOTE: The noise limiter is not ON when the power switch is in the ON position.

PRIMARY FILTER:

Function Selector: Selects PEAK, NOTCH, LOWPASS (LP), OR HIGHPASS (HP) in the primary filter.

Selectivity Control: Adjusts the bandwidth of the primary filter from 40 Hz to almost flat.

Frequency Control: Adjusts the center frequency of the peak, notch and the cutoff frequency of the lowpass and highpass circuits approximately 300 Hz to 3000 Hz.

AUXILIARY FILTER:

Function Switch: To select the PEAK function push button to the IN POSITION. To select the NOTCH function push button to the OUT POSITION.

Frequency Control: Adjusts the center frequency of the auxiliary peak and notch circuits between approximately 300 Hz to 3000 Hz.

Selectivity Control: Adjusts the bandwidth of the auxiliary circuits from 40 Hz to almost flat. To select the PEAK function PUSH IN this control. To select the NOTCH function PULL OUT this control.

PRIMARY FILTER OPERATION

PEAK: Turn Function Selector to PEAK. Set the SELECTIVITY control to about the 10 o'clock position. Adjust FREQUENCY control for maximum response to the desired signal. Selectivity can be increased by turning the SELECTIVITY control clockwise. FREQUENCY and SELECTIVITY control should be adjusted alternately to obtain maximum selectivity and best signal intelligibility.

The peak mode can be used on CW to narrow in on a signal and greatly reduce unwanted signals. Peak mode is also useful on wider bandwidth such as RTTY and SSB. Adjust SELECTIVITY until the desired signal just fills the passband and interfering signals are reduced.

NOTCH: The depth of the notch filter is approximately 70dB. Notch frequency is adjustable from approximately 300 Hz to 3000 Hz. The primary notch filter can be set to the notch mode by setting the Function Selector to NOTCH. Set SELECTIVITY control to the 9 o'clock position. Adjust FREQUENCY control to remove the CW signal or heterodyne. Increase SELECTIVITY (clockwise) to narrow the bandwidth of the notch. Readjust FREQUENCY control if necessary. The unwanted heterodyne should become weaker and the desired signal become clearer as notch selectivity is increased. At high selectivity on notch, the FREQUENCY control tuning is very critical and the notch frequency is hard to locate. If the SELECTIVITY control is rotated past the 3 o'clock position clockwise the notch depth will decrease.

Notch mode is very helpful in removing heterodynes, stations tuning up on your QSO, or CW signals on or near your frequency. The notch can be used very effectively on AM when two stations are heterodyning one another. The heterodyning can be reduced by notching out the interfering tone.

LOW PASS: Low pass cutoff is adjustable from approximately 300 Hz to 3000 Hz with the FREQUENCY control. The SELECTIVITY control adjusts the steepness of the cutoff. Low pass mode is useful in reducing annoying high frequency static, hiss and splatter.
When selectivity is increased beyond the 2 o'clock position, a peak will form at the frequency set on the FREQUENCY control. The more the selectivity is increased the more pronounced the peak will become. This peak may be preferred for CW operation when extra audio is needed and low frequency signals are not a problem. Because circuit gain rises in the lowpass mode, the input audio level may need to be reduced to prevent overdriving the filter. Gain on frequencies below the set frequency will drop as selectivity is increased. Therefore, when using the low pass mode for SSB, the SELECTIVITY control should not be set beyond the 2 o'clock position.
HIGHPASS: Highpass mode is set by turning the Function Selector to HIGHPASS (HP). To remove unwanted low audio frequencies, set the SELECTIVITY and FREQUENCY controls for the desired response.

AUXILIARY FILTER OPERATION

PEAK: To set the auxiliary filter in the peak mode, simply push the FUNCTION button to the IN POSITION. Set the SELECTIVITY control to about center range and adjust the FREQUENCY control to the desired signal. Adjust SELECTIVITY and FREQUENCY controls alternately for the best signal and the desired bandwidth.
In the peak mode the auxiliary filter can be used to further enhance the primary filter operation. It can be used to obtain very narrow bandwidths with good skirt selectivity and little ringing when the primary filter is in the peak mode, or to limit the bandwidth when the primary filter is in the notch, lowpass, or highpass mode. **NOTE:** When using both filters in the peak mode with narrow bandwidths, the best skirt selectivity and least attenuation will be obtained by setting both the auxiliary and primary filter frequency controls to the same center frequency. This can easily be done by first peaking the desired signal with the auxiliary FREQUENCY control and then peaking it with the FREQUENCY control on the main filter.
NOTCH: Notch mode on the auxiliary filter is set by pushing the FUNCTION button to the OUT POSITION with the primary filter in any mode. Set the SELECTIVITY control to about center range and adjust the FREQUENCY control to remove the unwanted signal. SELECTIVITY and FREQUENCY should be adjusted alternately. Remember at high selectivity on notch, the notch frequency is difficult to locate and the FREQUENCY control must be tuned very carefully.
The auxiliary notch filter is used to remove an unwanted signal in the passband of the primary filter. It can remove a heterodyne from SSB or AM signal is when the primary filter is set to peak, lowpass or highpass mode. It can also be used to notch out an adjacent CW signal which is too close to be removed by peaking the filters.

GENERAL OPERATION

NOISE LIMITING CIRCUITS:

The SSB noise limiter is a peak clipper circuit which follows the average peak audio level but clips peaks above the average level. The input signal must be at least 0.7 volt peak for proper noise limiting.
The CW noise limit is a trough limiter which removes the low level background noise between the signals. Experimentally, set the audio or RF gain so that the signal is passed but the noise is blocked. If the audio level into the filter is set too low the signals will not get through. If the audio is set too high the noise will also get through. Setting the audio too high could overload the filter and distort the desired signals.
NOTE: When the noise limiter is used (SSB or CW) the audio level will decrease due to the clipping action of circuits removing the noise.

SIMULATED STEREO OPERATION:

This feature allows copying stations who are calling out of the filter bandpass or who have drifted out of the filter bandpass. This is accomplished by letting one ear hear the unfiltered audio and the other ear hear only the filtered audio. The brain hears all of the signals but the main signal stands out and is easily recognized. If the signal drifts out of passband it can still be heard and can easily be followed without losing contact. For best results, stereo headphones with individual volume control are recommended. This will allow you to set a comfortable balance between the filtered and unfiltered audio. If mono headphones are used, be sure to use a ¼ in. STEREO plug.
IMPORTANT: A mono plug will short out the input signal stopping the filter operation and could possibly damage your rig's audio output state. (A stereo plug is not necessary on the speaker output.)

IMPORTANT NOTES

1. The auxiliary filter is in series with the primary filter. If the auxiliary filter is not needed, set it to PEAK and turn the SELECTIVITY and FREQUENCY controls to minimum (counter-clockwise).
2. With high selectivity, the filter may have a tendency to ring in peak and lowpass modes. If this occurs decrease the selectivity.
3. Due to the very high internal filter gains in the lowpass mode with maximum selectivity and frequency, the filter may OSCILLATE. If this occurs reduce SELECTIVITY or FREQUENCY controls until it stops.
4. Strong signals can mask a weak signal by causing your receiver AGC (automatic gain control) to reduce gain. This may cause a weak signal to almost disappear. To minimize this problem the AGC might be turned off and the RF gain reduced. Increase audio gain to compensate for the loss of audio.

ALIGNMENT

The MFJ-752 primary filter is a two-stage filter which requires proper alignment to insure proper tracking between the two stages. The filter is properly aligned at the factory. If for any reason a realignment is necessary use the procedure below. **UNDER NO OTHER CIRCUMSTANCES SHOULD THE INTERNAL TRIMMERS (R1 and R2) BE ADJUSTED.** The filter will not function properly once either trimmer is moved without proper realignment.

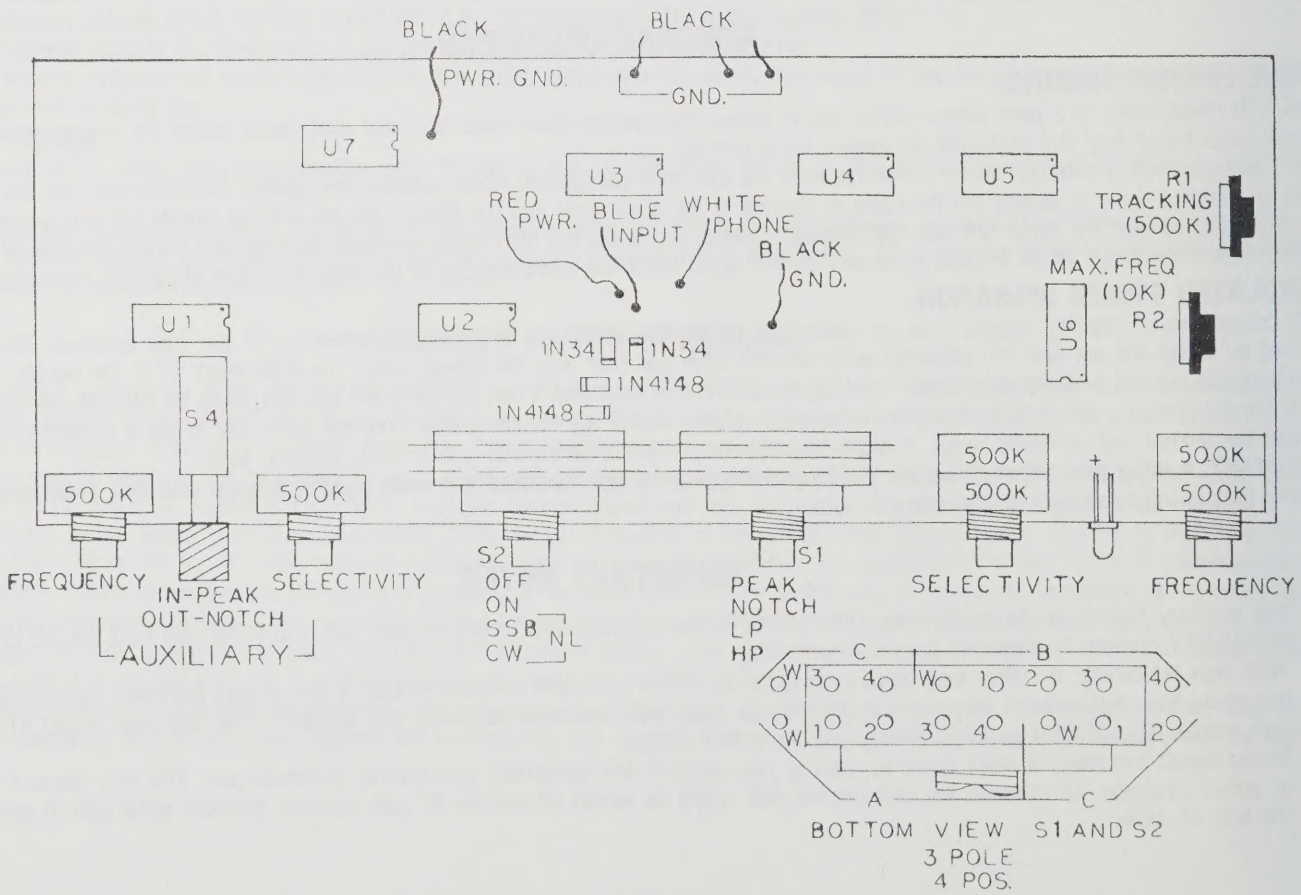
An audio signal generator and an OSCILLOSCOPE or an AC VTVM are needed for the alignment.

CONTROL SETTINGS:

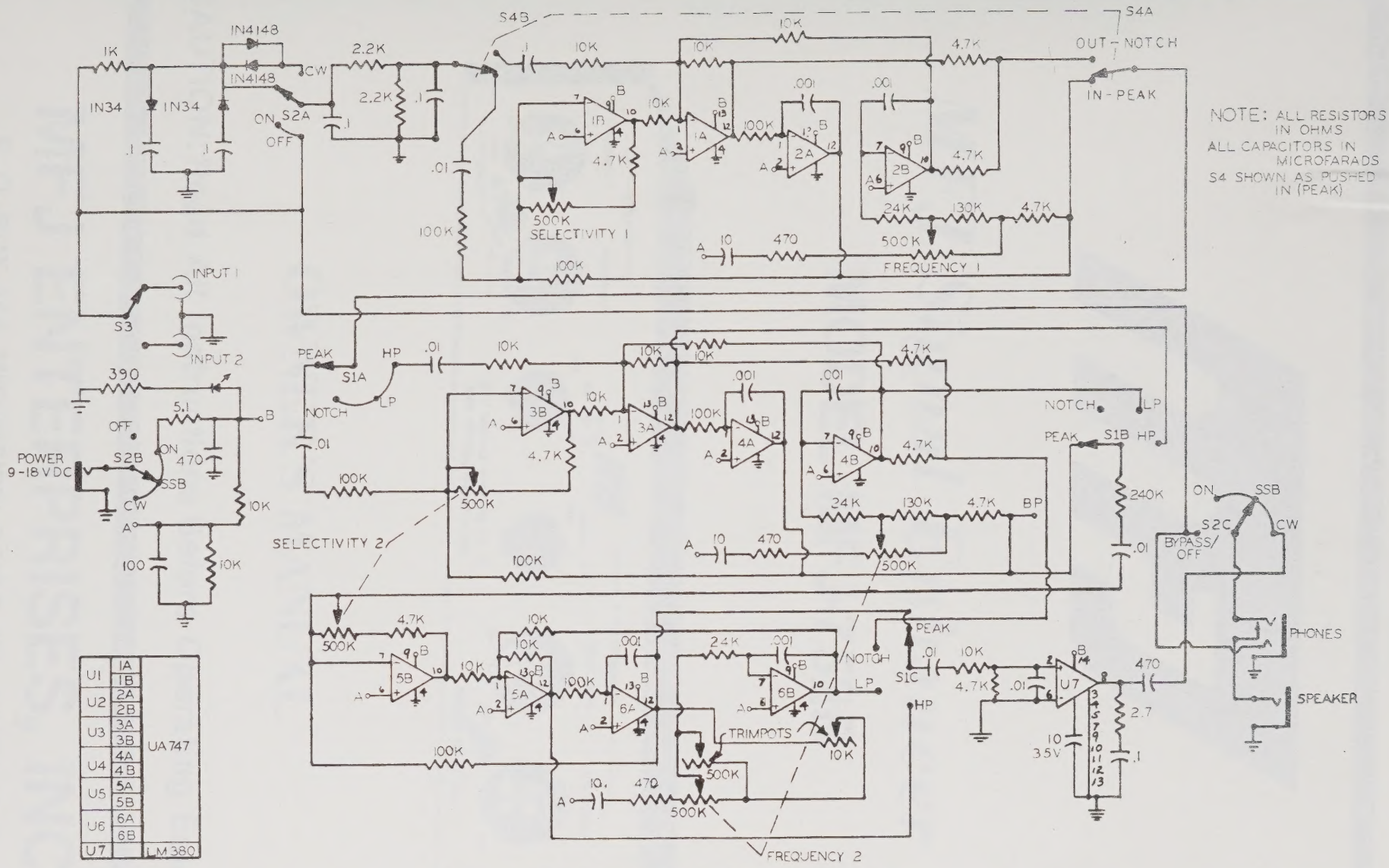
AUXILIARY FREQUENCY CONTROL: Minimum
AUXILIARY SELECTIVITY CONTROL: Minimum
AUXILIARY FUNCTION SWITCH: In for Peak.
POWER: On
PRIMARY FUNCTION: Notch
PRIMARY SELECTIVITY: 3 o'clock
PRIMARY FREQUENCY: Maximum

ALIGNMENT PROCEDURE:

1. Connect scope input to the speaker or phone output of the filter.
2. Connect signal generator to input 1 or 2 of the filter. Set the input switch on the filter accordingly.
3. Set signal generator for sine wave of 1 V p-p and adjust generator frequency control(s) for a null (minimum amplitude). Null should occur at about 3,000 Hz. Use X1 Hz generator frequency control for fine adjustment if available.
4. Switch Primary Function Selector to PEAK.
5. Increase Primary SELECTIVITY control to maximum.
6. Adjust R1 (10K) Maximum Frequency trimmer for maximum amplitude.
7. Set generator frequency to 1 kHz.
8. Set primary SELECTIVITY control to 3 o'clock.
9. Set primary filter to NOTCH and adjust primary FREQUENCY control for a null.
10. Increase primary SELECTIVITY to maximum.
11. Switch primary filter to PEAK and adjust R2 (500K) tracking trimmer for maximum amplitude. Reduce signal generator output level if clipping occurs.
12. End of the alignment procedure.



MFJ-752B COMPONENTS LOCATION DIAGRAM



MFJ-752B SCHEMATIC DIAGRAM

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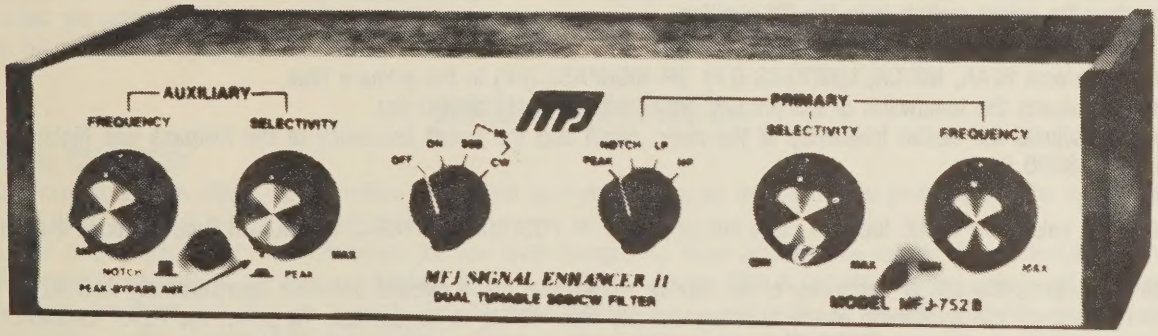
MODEL MFJ-752B



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INSTALLATION

1. Connect the power adapter [illegible] or any 9 to 18 volt DC supply to the power jack on the back of the MFJ-752 B. If a supply other than the adapter is used it must have a 2.5 MM subminiature plug. Wire the plug so the tip is positive. An 18V, 300 mA supply is required to obtain the full two watts audio output.
2. Using the proper connector, connect a shielded lead from the external speaker or headphone jack of the transceiver or receiver to the MFJ-752 B. Use an RCA phono plug to connect to the filter input. There are two inputs on the MFJ-752 B allowing connection to two receivers to the MFJ-752 B for greater convenience. The input is selected by the slide switch above the input-jacks.
3. Connect a speaker to the filter using shielded wire with a mono ¼ in. phone plug at the filter speaker output. For best results use a 4 to 16 ohm speaker.
4. Headphone operation is accomplished by plugging headphones into the phone jack on the back of the MFJ-752 B. When stereo headphones are used you will hear the signals in simulated stereo, that is, the unfiltered audio is fed to one ear and the filtered audio is fed to the other ear. (See "SIMULATED STEREO OPERATION" section.)
5. If mono headphones are used or simulated stereo is not desired, use a ¼ in. **STEREO** phone plug and wire the headphones between the tip terminal and ground. Leave the ring terminal disconnected. Any impedance headphones from 4 ohms up will work. **NOTE: DO NOT USE A ¼ IN. MONO PLUG IN THE HEADPHONE OUTPUT. A MONO PHONE PLUG WILL SHORT THE FILTER INPUT POSSIBLY DAMAGING YOUR RIG OUTPUT.**

FRONT PANEL CONTROLS

POWER SWITCH:

Selects power OFF, power ON, SSB Noise Limiter and CW Noise Limiter. The filter is bypassed in the OFF position. NOTE: The noise limiter is not ON when the power switch is in the ON position.

PRIMARY FILTER:

Function Selector: Selects PEAK, NOTCH, LOWPASS (LP), OR HIGHPASS (HP) in the primary filter.

Selectivity Control: Adjusts the bandwidth of the primary filter from 40 Hz to almost flat.

Frequency Control: Adjusts the center frequency of the peak, notch and the cutoff frequency of the lowpass and highpass circuits approximately 300 Hz to 3000 Hz.

AUXILIARY FILTER:

Function Switch: To select the PEAK function push button to the IN POSITION. To select the NOTCH function push button to the OUT POSITION.

Frequency Control: Adjusts the center frequency of the auxiliary peak and notch circuits between approximately 300 Hz to 3000 Hz.

Selectivity Control: Adjusts the bandwidth of the auxiliary circuits from 40 Hz to almost flat. To select the PEAK function PUSH IN this control. To select the NOTCH function PULL OUT this control.

PRIMARY FILTER OPERATION

PEAK: Turn Function Selector to PEAK. Set the SELECTIVITY control to about the 10 o'clock position. Adjust FREQUENCY control for maximum response to the desired signal. Selectivity can be increased by turning the SELECTIVITY control clockwise. FREQUENCY and SELECTIVITY control should be adjusted alternately to obtain maximum selectivity and best signal intelligibility.

The peak mode can be used on CW to narrow in on a signal and greatly reduce unwanted signals. Peak mode is also useful on wider bandwidth such as RTTY and SSB. Adjust SELECTIVITY until the desired signal just fills the passband and interfering signals are reduced.

NOTCH: The depth of the notch filter is approximately 70dB. Notch frequency is adjustable from approximately 300 Hz to 3000 Hz. The primary notch filter can be set to the notch mode by setting the Function Selector to NOTCH. Set SELECTIVITY control to the 9 o'clock position. Adjust FREQUENCY control to remove the CW signal or heterodyne. Increase SELECTIVITY (clockwise) to narrow the bandwidth of the notch. Readjust FREQUENCY control if necessary. The unwanted heterodyne should become weaker and the desired signal become clearer as notch selectivity is increased. At high selectivity on notch, the FREQUENCY control tuning is very critical and the notch frequency is hard to locate. If the SELECTIVITY control is rotated past the 3 o'clock position clockwise the notch depth will decrease.

Notch mode is very helpful in removing heterodynes, stations tuning up on your QSO, or CW signals on or near your frequency. The notch can be used very effectively on AM when two stations are heterodyning one another. The heterodyning can be reduced by notching out the interfering tone.

LOW PASS: Low pass cutoff is adjustable from approximately 300 Hz to 3000 Hz with the FREQUENCY control. The SELECTIVITY control adjusts the steepness of the cutoff. Low pass mode is useful in reducing annoying high frequency static, hiss and splatter.
When selectivity is increased beyond the 2 o'clock position, a peak will form at the frequency set on the FREQUENCY control. The more the selectivity is increased the more pronounced the peak will become. This peak may be preferred for CW operation when extra audio is needed and low frequency signals are not a problem. Because circuit gain rises in the lowpass mode, the input audio level may need to be reduced to prevent overdriving the filter. Gain on frequencies below the set frequency will drop as selectivity is increased. Therefore, when using the low pass mode for SSB, the SELECTIVITY control should not be set beyond the 2 o'clock position.
HIGHPASS: Highpass mode is set by turning the Function Selector to HIGHPASS (HP). To remove unwanted low audio frequencies, set the SELECTIVITY and FREQUENCY controls for the desired response.

AUXILIARY FILTER OPERATION

PEAK: To set the auxiliary filter in the peak mode, simply push the FUNCTION button to the IN POSITION. Set the SELECTIVITY control to about center range and adjust the FREQUENCY control to the desired signal. Adjust SELECTIVITY and FREQUENCY controls alternately for the best signal and the desired bandwidth.
In the peak mode the auxiliary filter can be used to further enhance the primary filter operation. It can be used to obtain very narrow bandwidths with good skirt selectivity and little ringing when the primary filter is in the peak mode, or to limit the bandwidth when the primary filter is in the notch, lowpass, or highpass mode. **NOTE:** When using both filters in the peak mode with narrow bandwidths, the best skirt selectivity and least attenuation will be obtained by setting both the auxiliary and primary filter frequency controls to the same center frequency. This can easily be done by first peaking the desired signal with the auxiliary FREQUENCY control and then peaking it with the FREQUENCY control on the main filter.
NOTCH: Notch mode on the auxiliary filter is set by pushing the FUNCTION button to the OUT POSITION with the primary filter in any mode. Set the SELECTIVITY control to about center range and adjust the FREQUENCY control to remove the unwanted signal. SELECTIVITY and FREQUENCY should be adjusted alternately. Remember at high selectivity on notch, the notch frequency is difficult to locate and the FREQUENCY control must be tuned very carefully.
The auxiliary notch filter is used to remove an unwanted signal in the passband of the primary filter. It can remove a heterodyne from SSB or AM signal is when the primary filter is set to peak, lowpass or highpass mode. It can also be used to notch out an adjacent CW signal which is too close to be removed by peaking the filters.

GENERAL OPERATION

NOISE LIMITING CIRCUITS:

The SSB noise limiter is a peak clipper circuit which follows the average peak audio level but clips peaks above the average level. The input signal must be at least 0.7 volt peak for proper noise limiting.
The CW noise limit is a trough limiter which removes the low level background noise between the signals. Experimentally, set the audio or RF gain so that the signal is passed but the noise is blocked. If the audio level into the filter is set too low the signals will not get through. If the audio is set too high the noise will also get through. Setting the audio too high could overload the filter and distort the desired signals.
NOTE: When the noise limiter is used (SSB or CW) the audio level will decrease due to the clipping action of circuits removing the noise.

SIMULATED STEREO OPERATION:

This feature allows copying stations who are calling out of the filter bandpass or who have drifted out of the filter bandpass. This is accomplished by letting one ear hear the unfiltered audio and the other ear hear only the filtered audio. The brain hears all of the signals but the main signal stands out and is easily recognized. If the signal drifts out of passband it can still be heard and can easily be followed without losing contact. For best results, stereo headphones with individual volume control are recommended. This will allow you to set a comfortable balance between the filtered and unfiltered audio. If mono headphones are used, be sure to use a ¼ in. STEREO plug.
IMPORTANT: A mono plug will short out the input signal stopping the filter operation and could possibly damage your rig's audio output state. (A stereo plug is not necessary on the speaker output.)

IMPORTANT NOTES

1. The auxiliary filter is in series with the primary filter. If the auxiliary filter is not needed, set it to PEAK and turn the SELECTIVITY and FREQUENCY controls to minimum (counter-clockwise).
2. With high selectivity, the filter may have a tendency to ring in peak and lowpass modes. If this occurs decrease the selectivity.
3. Due to the very high internal filter gains in the lowpass mode with maximum selectivity and frequency, the filter may OSCILLATE. If this occurs reduce SELECTIVITY or FREQUENCY controls until it stops.
4. Strong signals can mask a weak signal by causing your receiver AGC (automatic gain control) to reduce gain. This may cause a weak signal to almost disappear. To minimize this problem the AGC might be turned off and the RF gain reduced. Increase audio gain to compensate for the loss of audio.

ALIGNMENT

The MFJ-752 primary filter is a two-stage filter which requires proper alignment to insure proper tracking between the two stages. The filter is properly aligned at the factory. If for any reason a realignment is necessary use the procedure below. **UNDER NO OTHER CIRCUMSTANCES SHOULD THE INTERNAL TRIMMERS (R1 and R2) BE ADJUSTED.** The filter will not function properly once either trimmer is moved without proper realignment.

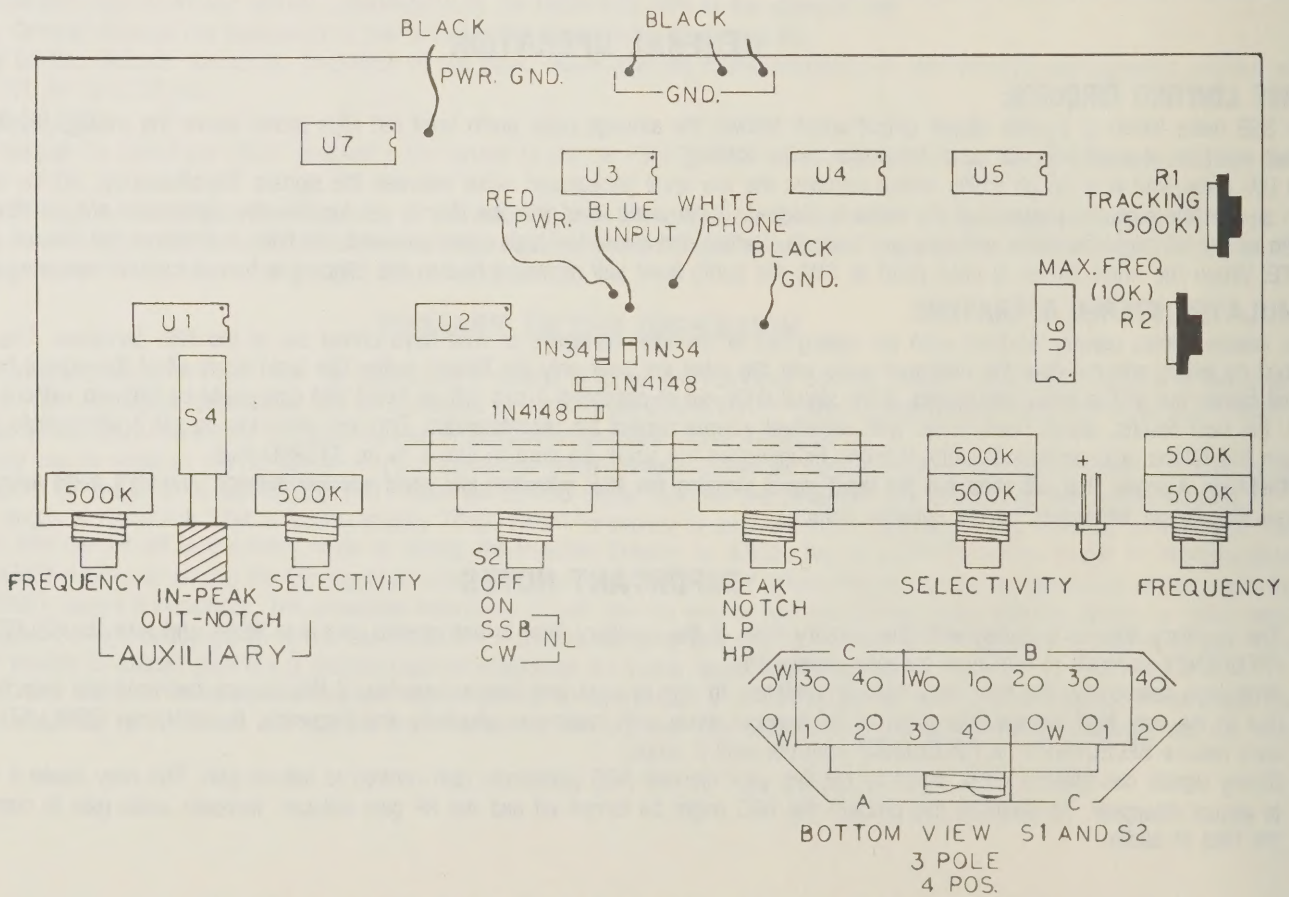
An audio signal generator and an OSCILLOSCOPE or an AC VTVM are needed for the alignment.

CONTROL SETTINGS:

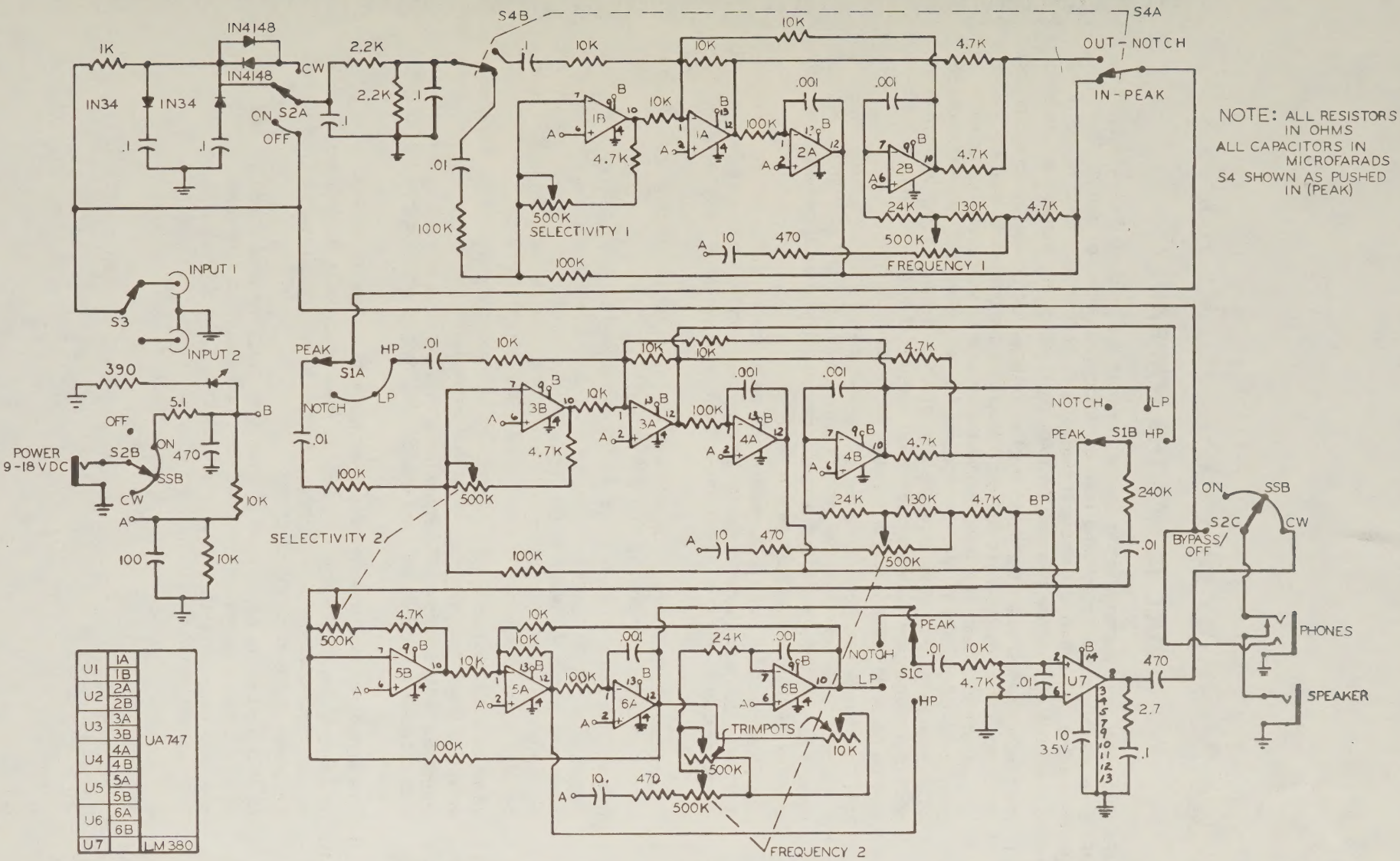
AUXILIARY FREQUENCY CONTROL: Minimum
AUXILIARY SELECTIVITY CONTROL: Minimum
AUXILIARY FUNCTION SWITCH: In for Peak.
POWER: On
PRIMARY FUNCTION: Notch
PRIMARY SELECTIVITY: 3 o'clock
PRIMARY FREQUENCY: Maximum

ALIGNMENT PROCEDURE:

1. Connect scope input to the speaker or phone output of the filter.
2. Connect signal generator to input 1 or 2 of the filter. Set the input switch on the filter accordingly.
3. Set signal generator for sine wave of 1 V p-p and adjust generator frequency control(s) for a null (minimum amplitude). Null should occur at about 3,000 Hz. Use X1 Hz generator frequency control for fine adjustment if available.
4. Switch Primary Function Selector to PEAK.
5. Increase Primary SELECTIVITY control to maximum.
6. Adjust R1 (10K) Maximum Frequency trimmer for maximum amplitude.
7. Set generator frequency to 1 kHz.
8. Set primary SELECTIVITY control to 3 o'clock.
9. Set primary filter to NOTCH and adjust primary FREQUENCY control for a null.
10. Increase primary SELECTIVITY to maximum.
11. Switch primary filter to PEAK and adjust R2 (500K) tracking trimmer for maximum amplitude. Reduce signal generator output level if clipping occurs.
12. End of the alignment procedure.



MFJ-752B COMPONENTS LOCATION DIAGRAM



MFJ-752B SCHEMATIC DIAGRAM

FULL 12 MONTHS WARRANTY

MFJ Enterprises, Inc. warrants to the original owner of this product, if manufactured by MFJ Enterprises, Inc. and purchased from an authorized dealer or directly from MFJ Enterprises, Inc. to be free of defects in material and workmanship for a period of 12 months from date of purchase provided the following terms of this warranty are satisfied.

1. The purchaser must retain the dated proof-of-purchase (bill of sale, cancelled check, credit card or money order receipt, etc.) describing the product to establish the validity of warranty claim and must submit the original or a machine-reproduction of such proof-of-purchase to MFJ Enterprises, Inc. at the time of warranty service. MFJ Enterprises, Inc. shall have the discretion to deny warranty without dated proof-of-purchase. Any evidence of alteration, erasure, or forgery of proof-of-purchase shall be cause to void any and all warranty terms immediately.
2. MFJ Enterprises, Inc. agrees to repair or replace at MFJ's option without charge to the original owner any defective product provided the product is returned postage prepaid to MFJ Enterprises, Inc. with a personal check, cashier's check or money order for **$4.00** covering postage and handling.
3. MFJ Enterprises, Inc. will supply replacement parts free of charge for any MFJ product under warranty upon request. A dated proof-of-purchase and a **$4.00** personal check, cashier's check or money order must be provided to cover postage and handling.
4. This warranty is **NOT** void for owners who attempt to repair defective units. Technical consultation is available by calling (601) 323-5869.
5. This warranty does not apply to kits sold or manufactured by MFJ Enterprises, Inc.
6. Wired and tested PC board products are covered by this warranty provided **only the wired and tested PC board is returned.** Wired and tested PC boards installed in the owner's cabinet or connected to switches, jacks, cables, etc. sent to MFJ Enterprises, Inc. will be returned at the owner's expense unrepaired.
7. Under no circumstances is MFJ Enterprises, Inc. liable for consequential damages to person or property by the use of any MFJ product.
8. **Out-of-Warranty Service:** MFJ Enterprises, Inc. will repair any out-of-warranty product provided the unit is delivered prepaid. All charges will be shipped COD to the owner.
9. This warranty is given in lieu of any other warranty express or implied.
10. MFJ Enterprises, Inc. reserves the right to make changes or improvement in design or manufacture without incurring any obligation to install such changes upon any of the products previously manufactured.
11. All MFJ products to be serviced in-warranty or out-of-warranty should be addressed to **MFJ Enterprises, Inc., 921A Louisville Road, Starkville, Mississippi 39759, USA** and must be accompanied by a letter describing the problem in detail along with a copy of your dated proof-of-purchase.
12. This warranty gives you specific rights, and you may also have other rights which vary from state to state.